

- Q1. a) A discrete time causal system has a transfer function 05
- $$H(z) = \frac{(1 - z^{-1})}{(1 - 5z^{-1} + 6z^{-2})}$$
- Determine the difference equation of the system
- b) Compute the convolution of these pairs of signals 05
- $$x[n] = \{1, (0), 5, 3, 6\}, \quad h[n] = \{1, 0, (5), 3, 1\}$$
- c) Write the names of five Basic time domain operation on sequence. 05
- d) What is aliasing? 05
- Q2. a) Draw the block diagram of digital processing of an analog signal. 05
- b) Determine the power and RMS value of the following signals. 05
- $$y(t) = 5\cos(50t + \pi/6)$$
- c) Find z-inverse causal signal x(n) 05
- $$X(z) = \frac{1}{(1 + 2z^{-1})(1 - 2z^{-1})}$$
- d) Defined the Total Energy, Average Power and Energy sequence. 05
- Q3. a) Compute the DFT of sequence  $x(n) = [5, 4+6j, -5, 4-6j]$  05
- b) Draw the complete signal flow graph of 4 points DIT FFT algorithm. 05
- c) Draw the block diagram of linear convolution using DFT. 05
- d) A discrete-time signal  $x[n] = \{2, 10, (5), -1, 3, 6\}$ . 05
- Sketch and label  $2 * x(n-3)$
- Q4. a) Find out the circular convolution  $y_c[n] = x[n] \circledast h[n]$ , Where  $x[n] = \{1, -2, 8, 8\}$ ,  $h[n] = \{3, 0, -16, 5\}$ . 05
- b) What are the conditions for a system to be LTI systems. 05
- c) A system has unit sample response  $h(n)$  is given by 05
- $$h(n) = -0.25\delta(n+1) - 0.5\delta(n) - 0.25\delta(n-1)$$
- Is the system is causal?
- d) Write the 4th order difference equation. 05
- Q5. a) Find out  $u(n-2) - u(n-3)$  05
- b) Check whether the following system is static or dynamic and also causal or non-causal system:  $y(n) = 3x(2n-1)$  05
- c) Write down the Classification of Systems. 05
- d) Check for periodicity of  $\cos(0.03\pi n)$ . 05
- Q6. a) When a system is said to be memory less? Give Example. 05
- b) State the significance of impulse response. 05
- c) Define symmetric and anti-symmetric signals. 05
- d) Compute the convolution of these pairs of signals 05
- $$x[n] = \{1, 2, 3\}, \quad h[n] = u[n]$$
- Q7. a) Find the inverse Z-transform of  $X(z) = \frac{z(z^2 - 4z + 5)}{(z-3)(z-1)(z-2)}$  10
- for ROC (i)  $2 < |z| < 3$  (ii)  $|z| < 1$
- b) What are the advantages of DSP? 05
- c) Why are FFT techniques so important in digital signal processing? 05